

SOURCES AND DISTRIBUTION OF DEBRIS IN THE GALVESTON BAY ESTUARY

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EXECUTIVE SUMMARY

Debris was identified as one of the priority problems in Galveston Bay Estuary by the Scientific and Technical Committee. The objective of this study was to characterize the occurrence, magnitude, distribution and possible sources of debris in the Galveston Bay Estuary.

Data gathered by volunteer citizens groups were used to characterize the shoreline environment, while debris occurring in bag seine and trawl samples taken by Texas Parks and Wildlife Department staff were used to characterize the shallow nearshore and deeper submerged environments of the bay, respectively. In addition, six transects were surveyed to characterize floating debris: two in West Bay, two in East Bay and two in the main part of Galveston Bay.

Debris items were classified by major category and analyzed. Major categories included plastics, styrofoam, glass, rubber, metal, paper, wood, cloth and construction/industrial. The construction/industrial category was not contained on the beach cleanup sheets, but was added during compilation because items such as shingles, tar, bricks, etc. were commonly found.

Spatially, most debris items were found along the shore, suggesting that material does not remain in the water long but is washed up on the shoreline or is quickly buried. While only 37 shoreline samples were taken, 3,855 items were collected from these samples. This compares with 28 and 27 items collected from the 80 nearshore and 104 submerged samples taken in the bay, respectively.

Debris items were less numerous in the East Bay area along the shore than in other shoreline areas in the estuary. This is probably due to the small amount of development in the area and prevailing southeasterly winds driving debris to other areas. However, a statement that debris is less numerous in all of East Bay is somewhat misleading. Samples were not taken along the shore in the intracoastal waterway in the East Bay area and anecdotal observations suggest that the shoreline along the intracoastal waterway may have a higher amount of debris than areas in East Bay which were sampled. This would be in agreement with results in submerged areas of the bay where the intracoastal waterway was shown to contain much more debris than other areas of the bay.

The majority of items collected in all environments were plastic. Plastics accounted for over 50% of the debris items in both the shoreline and submerged areas. They accounted for 25% of the items in the nearshore environment, with another 25% classified in the industrial/construction category.

There were no sightings of drums with toxic chemicals during the sampling period. However, one five gallon plastic container containing chemicals was found during a test of sampling procedures. Similarly, hospital waste was not prevalent but was present in one sample.

The debris problem is more than an aesthetic problem. It has consequences both economically and environmentally. Economically, tourism is a major revenue producer in Texas and most people avoid littered or polluted areas. Cleaning up debris also costs Texas coastal cities millions of dollars annually.

Debris is also a potential navigation problem. Large debris items can be costly in terms of damage to vessels and injuries suffered by boaters. Smaller items may wrap around propellers or clog intake ports also causing damage.

Environmentally, the effects on fish and wildlife populations are not known. However, effects on individuals are readily apparent. Plastic was the major component in the area and plastic items have been shown to cause death in organisms due to entanglement and ingestion. Animals may have their abilities to feed or avoid predators impaired by debris. Ingested plastic items may also cause blocked digestive tracts, damaged stomach linings, lessened feeding drives or may provide a source of toxic chemicals which impair or kill wildlife.

While there were no reported sightings of animals either dead or entangled in debris, we can not rule out this problem in the Galveston Bay Estuary. Sightings can be rare due to the fact that animals interact with debris over large areas which are difficult to sample. Most dead or disabled organisms are probably eaten by predators or decompose before an observation is made. In addition, when a dead animal is observed it may not be obvious what killed it unless a necropsy is performed.

People who discard used manufactured goods are the primary source of debris in the estuary. Many of the most numerous items, such as plastic bags, plastic pieces and metal beverage containers probably come from upland litter, shoreline recreationalists or recreational and commercial boaters. The prevalence of debris in the ICWW would suggest that shipping is a major contributor to the debris problem.

Stopping debris from entering Galveston Bay is the key to solving the debris problem. Removing debris once it has entered the system is costly and, while certainly necessary, does not solve the fundamental problem. Public education is probably the best solution. Television could be used to make people aware of the effects debris has both ecologically and economically. Proper disposal and recycling should be stressed. Encouraging the use

of reusable materials as opposed to disposable items is not only effective for keeping wastes out of the estuary but has the additional benefits of decreasing the need for additional landfills and reducing costs of cleanup and disposal.

Sufficient trash cans, recycling bins and disposal facilities should be provided at beaches, marinas and ports. Containers should have lids so that trash is not inadvertently entered into the system. Obviously, effective trash pick-up and disposal are critical. Incineration facilities may need to be added to ports to deal with shipping wastes. Problems in areas, such as parking lots, where debris collects, could be corrected by installing baffled drainage systems to control runoff. The most efficient way of eliminating the problem is to stop debris at its source.